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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/786,507	05/01/2001	Arzhang Ardavan	117-342	8750

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NIXON & VANDERHYE, PC
1100 N GLEBE ROAD
8TH FLOOR
ARLINGTON, VA 22201-4714

EXAMINER	
SOUW, BERNARD E	
ART UNIT	**PAPER NUMBER**
2881	

DATE MAILED: 12/15/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/786,507	ARDAVAN ET AL.	
	Examiner	Art Unit	
	Bernard E Souw	2881	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 March 2001* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *21-49* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *21-49* is/are rejected.

7)☒ Claim(s) *21-49* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *06 March 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), (GB 9819504.3), which papers have been placed of record in the file.

2. Receipt is acknowledged of papers submitted under 35 U.S.C. 371 (PCT/GB99/02943) which papers have been placed of record in the file.

Preliminary Amendment

3. The Preliminary Amendment filed 03/06/2001, Paper #5/A, has been entered.

Specification

4. The disclosure is objected to because of the following informalities:

► On page 1, paragraph 3, the wording "*intensities of normal emissions decay at a rate of* R^{-2}", does not conform with the general terminology accepted in the art, specifically regarding the words "*emission*", "*decay*", and "*rate*", these unusual words rendering the expression vague and not understandable to one of ordinary skill in the art. It is well known in the art that the *intensity* of a *normal* laser beam or laser "*emission*" (sic!) does **not** appreciably "*decay*" (sic!) over a significant distance *R*. Either Applicant's statement is incorrect, or Applicant meant a fully different thing than what he is trying to express with that highly unusual wording.

Even if Applicant is trying to mean something different, the statement regarding "*decay at a rate of* R^{-2}" is still not understandable, why it is worthwhile mentioning at all. It is generally known in the art that an ***interference*** normally ***redistributes*** the light intensity in such a way that it significantly deviates from a normal homogeneous distribution. Hence, the wording "*decay at a rate of* R^{-2}" has completely missed the point. A classic example is the previous example of a laser beam, which is basically a superposition of a whole bunch of mutually *interfering* electromagnetic *plane waves* having (slightly) differing propagation directions. Nobody would expressly appeal for attention that laser beams do not "*decay at a rate of* R^{-2}".

5. The disclosure is ***strongly*** objected to because of the following inconsistencies already bordering to an incredibility of the invention:

(a) On page 4, paragraph 2, line 2, the wording "***the superluminally rotating source*** *from the standpoint of geometrical optics*" is in direct violation of a known law of nature, i.e., the Special Theory of Relativity, which prevents any material object from achieving luminal (let alone superluminal) speed in vacuum, since its mass would then become infinite, as generally understood in the art.

(b) On page 6, paragraph 1, lines 1-2, the wording "*so the speed of the source* ***exceeds*** *the wave speed*", the wave speed being tacitly understood as being the light speed in vacuum, c, is again in direct violation of a known law of nature, i.e., the Special Theory of Relativity, by the same token as previously recited.

(c) On page 7, paragraph 3, line 1, the wording "*In the highly superluminal regime*" is again in direct violation of a known law of nature, by the same token as recited above.

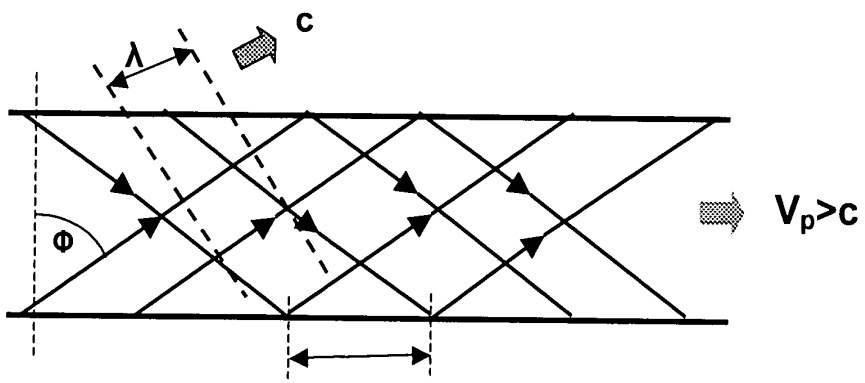
(d) On page 27, paragraph 3, lines 7-8, the wording "*this polarized region can be set in accelerated motion with a superluminal velocity*" is again in direct violation of a known law of nature, by the same token as recited above.

(e) Owing to the above objections, (a) to (d), and possibly still many others not yet discovered by the Examiner, the credibility of the invention is very strongly put in question, for its obvious violation against a known law of nature. Although in a few other occasions Applicant seems to vaguely avoid such violation, as reflected on page 2, paragraph 2, line 1, by reciting "*The speed of the moving* ***distribution pattern*** *may be superluminal*", and again on page 3, paragraph 3, lines 4-5, by reciting "*whose distribution* ***patterns*** *propagate with a phase speed exceeding the speed of light in vacuo*" << *which are here not objected because a pattern is not a material object (in this case the material object may not be moving at all), and hence, may well achieve, or even exceed, the speed of light in vacuo, c* >>, these statements have been effectively overridden by more frequently recited contradicting statements claiming on superluminal velocities of material objects throughout the entire disclosure. Such a violation of natural law leads to a §101 rejections based on incredibility of the invention and/or its inoperativeness, as well as to a §112/¶.1 claim rejections based on enablement and §112/¶.2 claim rejections based on indefiniteness (see Claim Rejections below).

Corrections are required. Applicant is advised, not to introduce New Matter in obviating this objection.

(f) Applicant is advised to eliminate the misleading word "*superluminal*" entirely from the disclosure. Applicant's terminology "*superluminal*" is misleading, because in fact there is ***no superluminal speed*** at all. "Superluminally" moving patterns, e.g., phase patterns, or field/voltage patterns, have been known in the art for almost the age of electromagnetic theory itself, as it routinely occurs in electromagnetic waveguides. This is a fact that can be found in almost every textbook on electromagnetic waveguides, e.g., "Introduction to Microwave Theory" by Atwater (1962), as specifically recited on page 82, lines 8-10, in reference to Fig. 3.2 on page 59 and Eq. 3.137 on page 81 (see attached PTO-892). The e.m. wave in a waveguide can be considered as a superposition of two plane waves reflected to and fro between the waveguide walls at an angle Φ (see Fig.1 below).

Fig. 1: Wavefronts and Phase Velocity in a Waveguide



The phase velocity V_p in the waveguide propagation direction z is defined by Atwater's Eq. 3.136. Although the phase velocity perpendicular of the wavefront remains equal to c, the phase velocity in the z direction is V_p=c/sinΦ, which is always larger than c for

$\Phi>0$. At the waveguide cut-off ($\beta_g=0$) the phase velocity approaches infinity (see Atwater's Fig. 3.2).

In case of Applicant's invention, the wave propagation into free space does not differ much from the waveguide situation above, here easily replicated by substituting one of the waveguide walls by an antenna array while eliminating the other, thus removing the reflected waves. Although the phase or voltage pattern along the antenna array (waveguide wall) is still moving in the z direction at a "*superluminal*" velocity, $V_P>c$, the wave velocity propagating into free space remains equal to c. In other words, there is ***no real*** superluminal velocity involved. Interference between adjacent array elements causes the wavefront of the emitted wave propagate at an angle Φ, as recited by Hopwood et al. (USPAT # 4,749,995) in Col.2/ll.40-47 in reference to Fig.1, and by O'Donnell et al. (USPAT 4,809,184) in Col.4/ll.30-35 and Col.5/ll.20-30 in reference to Fig.1.

Based on the discussion above, claim limitations reciting any ***distribution pattern*** moving at "*superluminal*" velocities, such as recited in claims 21, 23 and 27, are inappropriate. Although not principally incorrect, such limitation is misleading, for reciting something that is completely irrelevant to the subject matter of the invention, and furthermore, has no significance in the real world. Although the phase velocity in a waveguide is always greater than c, it is the group velocity that is relevant to the real world, e.g., as communication signal carrier. This group velocity is always less than c.

Applicant's invention has *much less* to do with current distribution pattern moving at superluminal velocities rather than with beam steering and beam focusing of a

phased array antenna. The latter has been well known since many decades in a diverse area such as radar technology (Hogwood et al., 1988), directed energy weapons (Ensley 1984, USPAT 4,456,912) and medical diagnostics and therapy (Corl, 1990, USPAT 4,974,211).

In contradiction to Applicant's claim, there is evidently no superluminal wave propagation or any other anomaly generated by any of the methods using any of the antenna configurations disclosed as Applicant's invention. The observed result is nothing else than a normal (luminal) beam radiated at a variable angle Φ. In view of the overwhelming evidences brought up in this Office Action (see PTO-892) , the burden of proof returns back to the Applicant's side in case Applicant insists the invention is capable of generating superluminal or any other unique form of light propagation.

(g) The lengthy specification has not been checked to the extent necessary to determine the presence of all possible errors of the same type as recited above from (a) to (d). Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

6. Claims 21, 23 and 27 are rejected under 35 U.S.C. 101 because the claimed invention is not supported by either a specific asserted utility or a well-established utility.

Claims 21, 23 and 27 recite limitations of a superluminal velocity, or a velocity exceeding the velocity of light in vacuo. Since the disclosure recite specific statements that indicate a violation of physical law(s), claims 21, 23 and 27 are deemed incredible when interpreted in light of the specification, and hence, are not supported by a well established utility. Even if the claims are interpreted in such a way so as to avoid any violation of natural laws, the recitations of "*polarization current* ***distribution*** *that moves with superluminal velocity*" in claims 21, 23 and 27, and also "*the envelope of the wavefronts ... possesses a* ***cusp***" specifically recited in claim 27, have no significance in the real world, as already pointed out in the previous objection to the specification with the exemplary discussion on phase and group velocities in a waveguide. Hence, the claims lack any specific asserted utility.

Use Claim

7. Claims 30-49 are rejected under 35 U.S.C. 101 because the claimed recitation of a use, without setting forth any steps involved in the process, results in an improper definition of a process, i.e., results in a claim which is not a proper process claim under 35 U.S.C. 101. See for example *Ex parte Dunki*, 153 USPQ 678 (Bd.App. 1967) and *Clinical Products, Ltd.* v. *Brenner*, 255 F. Supp. 131, 149 USPQ 475 (D.D.C. 1966).

Consequently, claims 30-49 are excluded from all first office actions on the merits and final rejections.

Claim Rejections - 35 USC § 112 / 1st paragraph

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

8. Claims 21, 23 and 27 are also rejected under 35 U.S.C. 112, first paragraph. Specifically, since the claimed invention is not supported by either a specific asserted utility or a well established utility for the reasons set forth above, one skilled in the art clearly would not know how to use the claimed invention.

Claim Rejections - 35 USC § 112/ 2nd paragraph

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. Claims 21, 23 and 27 are also rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The independent claim 21, from which claims 23 and 27 depend, fails to identify the particular electrode configuration being used to generate polarization current: It is not at all clear, whether it is a configuration shown in any one of Fig.1 to Fig.6, or any one shown in Fig.7? Specific electrode configuration is only recited in claim 25 as being the configuration of Fig.7b, and in claim 26 as being the configuration shown in Fig.7a. In regards of this ambiguity, the specific means to apply the polarizing voltage to, or polarization current into, the polarizable medium critical or essential to the practice of

the invention but not included in the claim(s), is not enabled by the disclosure. See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976).

In order to proceed with this examination, a linear electrode configuration as depicted in Fig.7a is assumed by the examiner. However, for claim 25 the configuration of Fig.7b will be assumed, despite its inconsistency with the dependent claim 21. It is thus obvious that all the claims here involved have to be reformulated.

Use Claims

10. Claims 30-49 provide for the use of the invention for various applications, ranging from spectroscopy over semiconductor manufacturing process to medical applications, but, since the claims do not set forth any steps involved in the respective method/process, it is unclear what method/process applicant is intending to encompass. A claim is indefinite where it merely recites a use without any active, positive steps delimiting how this use is actually practiced.

Consequently, claims 30-49 are excluded from all first office actions on the merits and final rejections.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

11. Insofar the Examiner can ascertain beyond the above rejection under the first and second paragraphs of 35 U.S.C. 112, claims 21-22 are rejected under 35 U.S.C. 102(b) as being anticipated by Bridges (USPAT 5,704,355).

Bridges discloses an apparatus for generating electromagnetic radiation as expressly recited in Col.2/ll.20-22, comprising a polarizable medium 410A to 410D depicted in Fig.14, as recited in Col.16/ll.1-14; and means of generating a polarization current whose distribution pattern moves with a superluminal speed, as recited in Col.16/ll.16-34, whereby the superluminal speed is inherently recited in Col.16/ll.29-34 in reference to Fig.14, i.e., in case the device is used for wave propagation in free space, so the medium 418 is air or vacuum and V is equal to c in the formulae recited in Col.16/ll.31-33.

Although Bridges's invention is more directed to medical treatment, in which the medium 418 is human tissue, and hence, v<c, Bridges expressly recites in Col.2/ll.16-36, even more clearly in Col.2/ll.55-67 & Col.3/ll.5-15, that the invention is derived from and hence, inherently also applicable to open air or vacuum environment. Thus, an equivalent e.m. system operating in air or vacuum is inherent in O'Donell's, including appropriate changes such as air or vacuum for medium 418, and that V is equal to c.

▶ Specifically regarding the limitation of the distribution pattern having an ***accelerated*** motion with a superluminal speed, as recited in claim 21, such motion is known to focus the radiated beam, as inherently understood from Col.16/ll.29-34.

► Specifically regarding the limitation of the radiated e.m. wave consisting of both non-spherically decaying component and a spherically decaying component, as recited in claim 21, an interfering wavefronts can always be inherently considered as a superposition of non-spherically decaying component having an inhomogeneous intensity distribution ~ R^{-x} with x<2 (such as a laser as an extreme representative), and a spherically decaying (non-interfering) component having a homogeneous intensity distribution ~ R^{-2}.

► Regarding claim 22, Bridges's polarizable medium, i.e., the most important part of the antenna 410A-410D in Fig.14, is a dielectric substrate, as expressly recited in Col.22/ll.33-34.

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Insofar the Examiner can ascertain beyond the above rejection under the first and second paragraph of 35 U.S.C. 112, claims 23-24 and 26-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bridges in view of Miller (USPAT 4,131,896) or Nunnally (IEEE Transactions on Electron Devices Vol.17/No.12, 1990, pp.2439-2445) in further view of Zucker et al. (USPAT 5,109,203), hereafter referred to as Zucker-203.

13. Bridges shows all the limitations of claim 23, as applied previously to the parent claim 22, except the recitation of electrode pairs positioned opposite to each other as a means to induce the polarization current of claims 21 and 22.

Miller discloses an apparatus for generating electromagnetic radiation equipped with electrode pairs, 36 & 20, as recited in Col.5/ll.13-19, positioned opposite to each other as a means to induce the polarization current in the radiating elements 26, as recited in Col.4/ll.66-68 & Col.5/ll.1-66 in reference to Fig.6. While Miller's invention is primarily aimed at compensating for impedance variations over the scan angle, as recited in the Title and Abstract, it would have been obvious to one of ordinary skill in the art by the time the invention was made to feed Miller's antenna array with conventional phase controlled electromagnetic signal, as readily taught by Bridges, i.e., by using time delays applied to phase control devices 408, as recited in Col.16/ll.10-41.

Note, time delay and phase control are representing the same method of beam steering in phased arrays, since a time delay automatically results in a phase shift of the signal wave. The terminology "*time delay*" is usually used in case of pulsed beams, whereas "*phase control*" or "*phase shift*" is more appropriate for continuous wave (cw) electromagnetic beams.

Miller's modification applies in case the means of applying voltage or current, hereafter simply denoted as "*applicator*", is designed as an antenna array that allows wave transmission in the angular range of $\Phi<90^0$ to $\Phi=0^0$, but effectively blocks or excludes the $\Phi=90^0$ direction (please refer to Fig.1 of this Office Action for a definition of

Φ). In this case the polarization current distribution pattern applied to the array moves with $V_p>c$ (corresponding to $\Phi<90^0$) to infinity (corresponding to $\Phi=0^0$).

It would have been obvious to one of ordinary skill in the art by the time the invention was made to modify Bridges's array of horn antenna elements by Miller's capacitor-like dipole antennas, in order to have the capability of scanning the angular direction perpendicular to the array, and to have an antenna array with uniform impedance across the scan range, as taught by Miller.

14. Alternatively, claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bridges in view of Nunnally and further in view of Zucker-203. This alternative rejection is applicable in case the "*applicator*" is designed as an antenna array that blocks wave transmission in the angular range of $\Phi<90^0$ to $\Phi=0^0$, i.e., as linear capacitor array depicted in Fig. 7a of Applicant's disclosure. As generally known in the art, the generated electromagnetic wave propagates along the transmission line ($\Phi=90^0$) at a velocity given by the wave velocity of the transmission line formed by the sequentially connected capacitors.

Nunnally discloses an apparatus for generating electromagnetic radiation equipped with electrode pairs positioned opposite to each other as a means to induce polarization current, as shown in Fig.8 and recited on page 2444, section A. "Frozen-Wave Generator", paragraph 1 & 2.

It would have been obvious to one of ordinary skill in the art by the time the invention was made to modify Bridges's array of horn antenna elements by Nunnally's

linear array of capacitors forming a transmission line, in order to transmit the e.m. signal along the capacitor array, since the performance characteristics of such a transmission line is well known in the art, so as to render the design straightforward and the effort requirement minimum.

While Nunnally's frozen-wave generator transmits a pulsed e.m. wave of a particular square-wave form that has been previously "frozen" in the capacitor array, in case of a continuous wave it would have been further obvious to one of ordinary skill in the art by the time the invention was made to further modify Bridges's device that has been previously modified by Nunnally's, now also by Zucker-203 as depicted in Fig.4A and Fig.3 & 4, with Zucker-203's time-trigger diodes 28, 30, 32 in Fig.1C replaced by Nunnally's photoconductive triggers shwon in Fig.8, while using Zucker-203's horn antenna 26 shown in Fig. 3 & 4 to transmit the e.m. wave in a quasi-continuous manner.

Thus, instead of releasing a frozen wave-form at once as conducted by Nunnally, in dealing with a continuous wave one of ordinary skill in the art may operate or activate Nunnaly's photoconductive triggers sequentially under a controlled time-delay as taught by Zucker-203, such that the induced current distribution moves faster than light speed in vacuo, $V_p>c$, as suggested by Bridges, instead of simultaneously, as in Nunnaly's ($V_p \rightarrow \infty$). However, as known to one of ordinary skill in the art, the resulting waveform will not propagate along the transmission line at a superluminal velocity, as believed by Applicant, but instead, at a velocity given by the propagation property of the transmission line.

It would have been further obvious to one of ordinary skill in the art by the time the invention was made to further modify Bridges's device previously modified by Nunnally's, also by Zucker-203's, in order to obtain a quasi-continuous emission of broad-spectrum square-wave trains out of Zucker's horn antenna placed as a load at the end of Nunnally's linear array of capacitors.

Note, although Zucker-203's teaching is not at all necessary to successfully reject claim 23, such a combination is appropriate to establish at least a specific utility while providing a basis for the next dependent claims. This rejection anticipates to have overcome the previously applied § 101 and § 112 rejections based on a lack of general and/or specific utilities.

15. Regarding claims 24 and 28, the limitation that the spectrum of the emitted radiation contains frequencies higher than the modulation frequency of the emitting current is rendered obvious by the fact generally known in the art that a square-wave inherently contains frequencies (much) higher than the base modulation frequency as a result of the many overtones thereby produced.

16. Regarding claim 26, Nunnally's polarizable medium has a rectilinear shape, since it is embedded between the capacitor plates that form a linear sequence.

17. The limitation of claim 27 regarding the accelerated motion of the polarization current distribution is already encompassed in claim 21, whereas the further limitation

regarding a cusp has been previously rejected as having no significance in the real world, and hence, does not further limit the claim.

18. Insofar the Examiner can ascertain beyond the above rejection under the first and second paragraph of 35 U.S.C. 112, claims 25 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bridges in view of Fay (USPAT 5,128,687).

Bridges shows all the limitations of claims 25 and 29, as applied previously to the parent claim 21, except the recitation of the polarizable medium having the shape of a circle or an arc of the circle.

Fay discloses an apparatus for generating electromagnetic radiation equipped with polarizable medium in form of radiating elements 24(1) through 24(N) that are arranged in the form of an arc of a circle of radius R, as depicted in Fig.2 and recited in Col.4/ll.44-52. Further, Fay's device is also equipped with phased array 4 consisting of focused phased array antennas 4(1) to 4(T), and still another array 26(1) to 26(T), all arranged on an arc of a circle of radius R, as recited in Col.4/ll.60-68 & Col.5/ll.1-13. Phased array 4 generates a beam 32 that focuses on a point in the near zone, as recited in Col.5/ll.7-13.

Obviously, Fay's device has much more capability than what is claimed by Applicant. However, those unneeded or undesired elements in Fay's device, together with their function(s), may be simply eliminated, since omission of an element and/or its function is obvious if the function of the element is not desired, required or intended. *Ex Parte Wu*, USPQ 2031 (Bd. Pat. App. & Inter. 1989).

In the alternative, Bridges as modified by Fay discloses the claimed invention except for the use of not less than three phased arrays, each having a different purpose and each being arranged on an arc of a circle, which is also a limitation of Applicant's claim 29. Since applicant has not disclosed that Applicant's single array solves any stated problem or has any particular purpose, it appears that the invention would perform equally well with Fay's three different arrays. Therefore, Applicant's use of a single array is a mere matter of design choice that is unpatentable, because it only involves routine skill in the art. In this respect, it would have been obvious to one of ordinary skill in the art by the time the invention was made to modify Bridges's device by Fay's multiple antenna arrays, in order to have multiple simultaneous beams that can be independently steered, as suggested by Fay in the Abstract.

Communications

19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Bernard E Souw whose telephone number is 703 305 0149. The examiner can normally be reached on Monday thru Friday, 9:00 am to 5:00 pm..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John R Lee can be reached on 703 308 4116. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9306 for regular communications and 703 872 9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 308 0956.

bes
October 23, 2003

JOHN R. LEE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800